



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,067	11/12/2003	Romney R. Katti	P02.0480(H0004235)	6346

128 7590 05/18/2006

HONEYWELL INTERNATIONAL INC.  
101 COLUMBIA ROAD  
P O BOX 2245  
MORRISTOWN, NJ 07962-2245

EXAMINER
----------

MCPHERSON, JOHN A

ART UNIT	PAPER NUMBER
----------	--------------

1756

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/706,067

Applicant(s)

KATTI ET AL.

Examiner

John A. McPherson

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3,5,7-12,14,16,18 and 20-25 is/are allowed.
- 6) ☒ Claim(s) 13 and 26 is/are rejected.
- 7) ☒ Claim(s) 2,4,6,15,17 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/20/04
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. Claims 2, 4, 6, 15, 17 and 19 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form.

Claim 2 states that the magnetic storage layer of claim 1 comprises one or more magnetic storage films. This statement does not appear to further limit the claim from which it depends because it includes all possible embodiments which are within the scope of claim 1 (i.e. the layer must comprise either a single film or a plurality of films, as there are no other possibilities).

Similarly, claims 4, 6, 15, 17 and 19 include all possible embodiments within the scope of the claims from which they depend.

### ***Claim Rejections - 35 USC § 102/103***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 5,949,707 to Pohm et al. [reference AC of the Information Disclosure Statement filed 2/20/04] (Pohm '707). Pohm '707 discloses a digital data memory element having a bit structure in a memory cell based on an intermediate separating material with two major surfaces having thereon a magnetoresistive thin film of differing thicknesses, wherein each memory cell structure is formed with a rectangular central portion and with a triangular portion tapering away therefrom at each end. See the abstract; column 5, lines 41-51; and column 6, line 44 to column 8, line 25. Although Pohm '707 does not disclose using a mask having stepped bit ends to make the bit structure, the disclosed structure appears to be substantially identical to that of the presently claimed product-by-process, as both memory elements comprise the same layer structure and have the same tapered end shape.

Even though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. See MPEP 2113.

3. Claims 13 and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 4,731,757 to Daughton et al.

Art Unit: 1756

(Daughton). Daughton discloses a magnetoresistive memory including thin film storage cells having tapered ends (see the title), wherein the memory cells comprise two magnetoresistive ferromagnetic film portions separated by an intermediate layer all of which are gradually narrowed at the ends thereof. See the abstract; column 6, line 40 to column 7 line 5; and Figures 2 and 3. Although Daughton does not disclose using a mask having stepped bit ends to make the cells, the disclosed structure appears to be substantially identical to that of the presently claimed product-by-process, as both memory cells comprise the same layer structure and have the same tapered end shape.

Even though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. See MPEP 2113.

4. Claims 13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0188382 to Mikelson et al. (Mikelson) in view of Applicant's discussion of the prior art in the specification. Mikelson discloses a method of making a sharp pointed structure comprising the steps of depositing a magnetoresistive film on a substrate, depositing an oxide layer on the magnetoresistive film, depositing a low contrast photoresist on the oxide layer, exposing the low contrast photoresist through a reticle having a partially triangular shape, developing the low contrast photoresist,

Art Unit: 1756

etching the oxide layer to form a sharp pointed structure, removing the low contrast photoresist, and etching the magnetoresistive film to form a sharp pointed bit structure.

See the paragraphs [0018], [0020], [0050], and Figures 3A-E and 6B.

Furthermore, Mikelson teaches that magnetoresistive random access memory elements (MRAM) rely on layers of magnetic film to store information, wherein the shape of the structure is critical to its performance, and that a structure with pointed ends results in better switching characteristics compared to a structure with flat ends. See paragraph [0052]. However, Mikelson does not disclose a layer structure for the layers of magnetic film in the MRAM.

In the specification, Applicant discloses that known MRAM cells typically comprise two ferromagnetic layers sandwiching a conductor. See page 1, lines 6-17 of the specification. It would have been obvious to one skilled in the requisite art to provide a layer structure comprising two magnetic layers with a nonmagnetic layer sandwiched between as the layers of magnetic film in the MRAM of Mikelson because it is taught that a MRAM having such a layer structure are typical in the art and known to provide the benefit of showing a large change in magnetoresistance.

Although neither Mikelson nor Applicant's discussion of the prior art disclose using a mask having stepped bit ends to make the memory elements, the disclosed structure appears to be substantially identical to that of the presently claimed product-by-process, as both the memory element of Mikelson in view of Applicant's discussion of the prior art and the memory element of the present invention comprise the same layer structure and have the same tapered end shape.

Even though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. See MPEP 2113.

***Allowable Subject Matter***

5. Claims 1, 3, 5, 7-12, 14, 16, 18 and 20-25 are allowed because in a process of making a magnetoresistive memory device as set forth in the present invention, the prior art does not teach or suggest the embodiment wherein the mask has stepped bit ends.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571) 272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

Art Unit: 1756

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John A. McPherson  
Primary Examiner  
Art Unit 1756

JAM  
5/11/06